IDAHO BUREAU OF LABORATORIES

IDAHO DEPARTMENT OF HEALTH & WELFARE

LABORATORY CONNECTIONS

Spring 2004

PERSPECTIVE

ANTIBIOTICS AND BIOCIDES: YOUR EXPERTS OR MINE?

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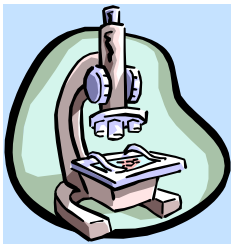
In this issue



Recent literature is replete with research indicating the excess use of biocidal compounds leads directly to the increase of antibiotic resistant bacteria. The anti-biocide experts contend — and have supportive research to show — that the excessive and improper use of triclosan, triclocarbon, and quaternary ammonium compounds not only leads to resistance to those compounds but also induces cross-resistance to antibiotics. There are articles indicating pine oil resistant *E. coli* are also resistant to several antibiotics. The same has been found for *Pseudomonas aeruginosa* and *Mycobacterium smegmatis* when triclosan is the biocide used. Reports such as these have caused many in the scientific and medical communities to issue warnings, at least informally, about the excessive use of these products. Biocides can now be found in furniture, kitchen and bathroom fixtures, nursery furniture, toys — and, of course, household soaps. One can find the names of the most commonly used biocides on the labels of a myriad of products . In theory, using more biocides increases the possibility of biocide-resistant bacteria, which increases the number of antibiotic resistant bacteria in the home and community.

What happens when this theory is put to the test? E.C. Cole et al (J. Appl. Microbiol. **95**:664, 2003) have found that when 10 households which use biocide containing products are compared with 10 households that do not use such products, there is no difference in the presence of antibiotic resistance in several targeted bacteria (Coagulase-negative Staph. sp., Staph. aureus, Pseudomonas, sp., Acinetobacter sp., and *E. coli*). The question, then, is who to believe — your experts or mine? The issue is far from resolved, and it will be interesting to see how it unfolds.

IBL Bench News

- Change has become a way of life for the Idaho Bureau of Laboratories (IBL) Construction continues on the BL-3 laboratory. The organic chemistry section has at long last recovered from the fire and is enjoying refurbished facilities along with new equipment and an expanded work force.
- Some old familiar diseases are again making their presence known. The virology section has experienced an increase in the number of requests for syphilis testing in response to an outbreak in western Idaho. At this time, the outbreak appears to be affecting males and females equally— which differs from recent outbreak patterns involving predominantly males.
- During the first quarter of 2004, the IBL confirmed the identification of 19 Salmonella representing 10 different serotypes, Typhimurium being the most common. (Samples associated with the Humane Society outbreak were not included in this summary). If, as the CDC studies indicate, for every one case of salmonellosis identified, 38 remain undiagnosed, we can project Idaho may have had over 700 individuals with salmonella in the first quarter of 2004.
- Airplanes are becoming a vector for measles. For more information visit the CDC Web site http://www.cdc.gov/mmwr.

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Environmental Mycobacteria "A Tower of Babble?"

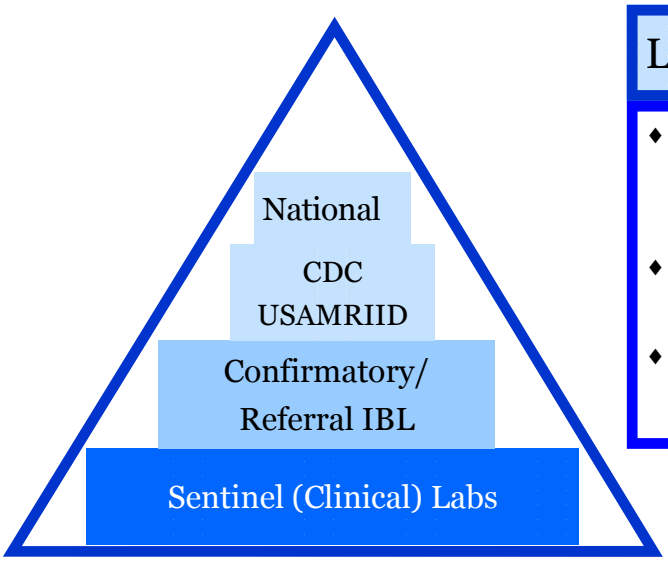
A jaunt through recent articles on Mycobacteria reveals a shocking and disturbing trend. Names like *Mycobacterium elephantis and M. hackensackiense* leap from the page. What's going on here?

The answer in part lies with the increased sensitivity of culture techniques, a larger population of immunocompromised individuals predisposed to environmental mycobacterium, and more environmental screening because of heightened awareness. In addition, newer methods of identification such as a nucleic acid sequencing are reordering the genus *Mycobacterium* and are identifying many new species. These changes mean we will be dealing with more than 100 species of mycobacteria, most of which are not included in any identification scheme.

Some basic guidelines for culturally significant mycobacteria:

- AFB present in original smears
- AFBs isolated from a normally sterile site such as deep tissue or fluids
- Repeated isolation of AFBs from a contaminated culture source such as sputum. A large number of colonies seen on primary culture media. The exceptions to this would be any isolation of *M. tuberculosis* complex and *M. kansasii.*

Water, ice, dust, soil and reusable medical devices such as bronchoscopes have all been implicated as sources of mycobacterial contaminates of samples: *M. gordonae, M. flavescens, M. avium* complex and rapid growers are common contaminants found in the environment. Also, environmental mycobacteria may be colonizers of animals growing in the body without causing the histopathogical changes associated with mycobacterial infections. Their significance may be unknown. Remember *M. elephantis* may be lurking out there for you!



LRN Has Changed only the Names

- National Laboratory, BSL 4, replaces Level D, includes
  Centers for Disease Control and U.S. Army Medical
  Research Institute for Infectious Diseases
- Confirmatory/Referral Labs, BSL 3, replaces Level B & C
  Idaho Bureau of Laboratories
- Sentinel Laboratories, BSL 2, replaces Level A
  All CLIA certified clinical labs who do bacteriology

West Nile Virus Testing: Public Health Update

The IBL is performing serological testing for human cases of West Nile Virus. Because most WNV infections are asymptomatic or cause mild febrile illness, physicians are being asked to submit only specimens for neuro-invasive (meningitis, encephalitis, meningo-encephalitis, polio-like syndrome) of unknown etiology. Testing of patients with only a febrile illness should be directed to a commercial laboratory. Serological testing can be performed on serum and cerebral spinal fluid. IgM antibody, which rises quickly and is long-lived is detectable within 8 days of infection. Collect acute specimen 3 to 10 days after onset of symptoms. A convalescent specimen collected 2 to 3 weeks after the acute is encouraged especially when an acute specimen is negative and may have been collected before antibody had formed.

Testing of human specimens by PCR is not recommended and will not be performed at IBL as antigen levels drop after clinical onset of illness and testing for antigen will often produce false negative results.

INTOXICATION with Staphylococcal Enterotoxin B (SEB)

The majority of *Staphlococcus aureus* produce a variety of enterotoxins or superantigens including SEB commonly associated with food poisoning. SEB is easily aerosolized, heat stable, soluble in water and has been studied as a bioweapon. Clinical symptoms are dependent upon exposure.

Exposure	Infective dose	Onset time	Symptoms	Duration
Inhalation	50% lethal dose (LD50) is 0.02µg/kg body weight	3 to 12 hours after inhalation	♦ Abrupt onset of high fever (103 to 106 °F) may also have chills ♦ Headache, myalgia ♦ Nonproductive cough, shortness of breath ♦ Retrosternal pain ♦ * GI symptoms	♦ Fever 2-5 days ♦ Cough up to 4 weeks ♦ 2 weeks normal activity
Ingestion	<0.01µg or 144 ±50 ng of SEB {10^5 or 10^8 organisms/ gram of food	Average 6 to 10 after ingestion of food. May be as short as an hour.	♦ Vomiting and nausea ♦ Abdominal cramps ♦ Watery diarrhea, may contain blood ♦ Headaches, low-grade fever ♦ Muscular cramping and/or prostration	Usually self-limiting, 1 to 88 hours.

*GI symptoms may accompany respiratory exposure due to inadvertent swallowing of toxin after normal mucocilliary clearance. Effects appear to be more severe to those exposed under stress. Severe cases may result in acute pulmonary edema or adult respiratory distress (ARDS) with frothy sputum, respiratory failure or a pathological drop in blood pressure.

Early clinical features may be confused with inhalation anthrax or Q fever.

Note: Progression of symptoms stabilizes with SEB intoxication.

SEB Intoxication Event

- **Numerous patients of all ages would display symptoms within a short period of time.**
- **Common geographic history.**
- **Diagnosis is primarily clinical.**
- **Confirmation by epidemiologic assay of tissue or body fluid.**

Environmental/Food Samples:

- **Contact Local Health District.**
- **Samples should be sent directly to IBL, an LRN Confirmatory/Referral Laboratory.**

Clinical Specimen Collection
Confirmation Only

Type Sample	Collection
Serum	5 ml. of serum (10 ml. blood in serum separator-type tube) Acute: As soon as possible. Convalescent: 7-14 days after onset.
Isolate	Send on appropriate agar slant that supports growth for toxin testing.
Nasal swab	Rub dry sterile swab (Dacron or rayon) on mucosa of anterior nares 12-24 hrs. after exposure.
Induced respiratory secretion	Sputum induced by instilling 10-25ml. of sterile saline into nasal passages and collecting in sterile container.
Urine	20-30 ml. in sterile container within hours of exposure.
Stool	10 to 50 grams of stool in sterile container.

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"Protecting the health and environment of the people of Idaho through testing and research"

Watch for information in the mail about the July 23rd workshop in Boise,

"**Public Health Preparedness: What is the Clinical Laboratory's Role?**"

Influenza Reminder

Some may be surprised to learn that although influenza is most prevalent and severe during the winter months, it can be present and equally dangerous year-round. Influenza circulates the world continuously. It would not be unusual for a global traveler to become infected with the virus. The Idaho Bureau of Laboratories maintains the ability to test for influenza viruses all year long. And surveillance, even during the summer months, is part of the strategy for early detection of viral changes and rapid developments of effective vaccine; a principal defense against the emergence.

Costs associated with this publication are available from the Idaho Department of Health and Welfare. IDHW-600-14015-7/95. Cost per unit $2.60